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Prospects of automation and data collection in performance recording programmes in Hungarian sheep industry

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SUMMARY - There were 40,500 head of breeding ewes belonging to 21 different breeds involved in official data collection and performance recording in Hungary at the beginning of 1997. The present data collection system, different levels of automation and the possible future of the whole automation are summarized in this study. Obtention of the different equipments necessary for automation of data collection in performance recording has just been started in Hungary. There is only one experimental dairy sheep farm in the country where this data collection is automated in milk production.

Key words: Data collecting, sheep, automation, performance recording.

RESUME - *"Perspectives d'automatisation et collecte de données dans le cadre des programmes de contrôle des performances dans l'industrie ovine de Hongrie". Il y a 40 500 têtes de brebis en reproduction appartenant à 21 races différentes qui font partie du système officiel d'enregistrement de données et de contrôle des performances en Hongrie au début de 1997. Cet article présente brièvement le système actuel de collecte de données, les différents niveaux d'automatisation et l'avenir possible de toute l'automatisation. On a à peine commencé en Hongrie à obtenir les différents équipements nécessaires pour l'automatisation de la collecte des données de contrôle des performances. Il y a une seule ferme expérimentale d'ovins laitiers dans le pays où cette collecte de données est automatisée pour la production de lait.*

Mots-clés : *Collecte de données, ovins, automatisation, contrôle de performances.*

Introduction

Several errors could be made during the process of data collection in performance recording. Most of these originate from human mistakes occurring during the reading of ear-tag numbers or of the scale of measuring equipment. Many efforts have been made so far to solve these problems and remove the human factor from this process as much as possible.

In Hungary there are 40,500 head (01.01.1997) of ewes belonging to 21 different breeds in the so-called nucleus level of sheep breeding, which is about 6-7% of the total ewe population of the country at present. Data collection is of serious importance in the case of these animals.

Measuring equipments are never cheap but the simple ones could be found on each farm. The better machines are more expensive and only the bigger farms can afford to get them. The most up to date equipments can be used on the best farms which are mainly big ones at the same time. The different levels of automation cannot be introduced without these necessary equipments.

In our study we intended to summarize the present situation and the prospects of automation in performance recordings in the Hungarian sheep industry.

The present data collection system

There are two organizations working in sheep performance recording and estimation breeding value in Hungary. The Hungarian Sheepbreeders' Association is organizing the data collection and controlling the breeding work on the nucleus farms. The Hungarian Institute for Quality Control (HIQC) is supervising the whole breeding work - as the animal breeding authority - and they determine the individual breeding value of the ewes belonging to various breeds and production on different farms.

The data collection is made by the eleven regional "instructors" of the Association who are regularly visiting the sheep farms. The reproduction data (tupping, artificial insemination, lambing, etc.) are collected by the farmer on different forms given by the Association. The instructors introduce these data into their portable computers (notebooks). The production data are collected by the instructors firstly on different forms and then on their notebooks.

The reproduction and production data are put on the central computer monthly, however, there is regular communication between the notebooks and the central computer though telephone lines.

The whole system is superintended by the main supervisors of the HIQC.

Data flow is summarized in Fig. 1. Unfortunately only a small part of the farmers has computers on the farm, so the basic level of data collection is made on paper.

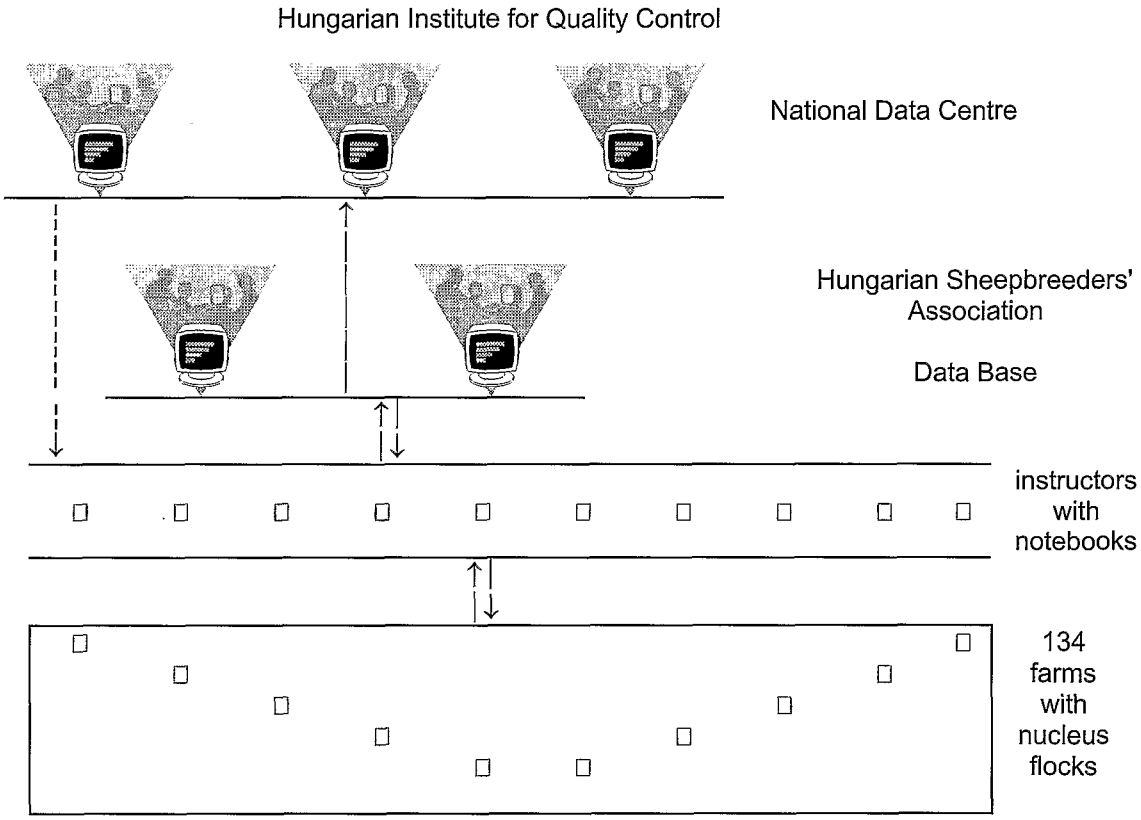

Fig. 1. The flow of information and use of computers.

The collected data

The information collected by the farmers and the instructors are covering the whole breeding work and the production.

Reproduction data

Two systems of mating are used in the breeding flocks: AI and harem tupping. In AI the number and breed of rams, the sperm quality and the date of insemination(s) are registered. In harem tupping besides the data of rams, the opening and closing days of harems are collected.

During the lambing the lambing date, birth type, birth weight and individual number and the sex of lambs are registered along with the number and breed of their parents. The next step is the weaning, when the date, body weight, ear-tag number and the disposal of lambs are booked.

Wool production data

Before shearing, the fleece of the breeding stocks are sampled and the height of the fleeces measured. The samples are examined in the Central Wool Laboratory of the HIQC, and the fibre diameter is determined. The clean wool yields are estimated both by subjective and objective methods. In the case of rams the whole coats are examined.

During the shearing the individual ear-tag number, the greasy wool weight and the date are logged.

Meat production data

In the central test units or during the on-farm performance test the same data are logged: (i) lambing and weaning data; (ii) starting and closing date of the test, the number of test days; (iii) the feed consumption data; (iv) body weights at the beginning and at the end of the test.

In the case of breeding stock following the birth and weaning weight the body weight is also measured at one year of age (between 10-15 months after birth) and the adult weight is determined between 22-26 months of age.

Milk production data

The collection of milk production data is following the system developed by Kukovics *et al.* (1988) during the mid 80's. It starts between 5-14 days after the weaning and repeated twice a day fortnightly-monthly (somewhere weekly) up to the end of lactation. On several farms individual milk samples are taken twice a day along with the milk measured during the lactation. The fat, protein, lactose and SCC contents are determined in the central milk laboratories.

There are two types of farms at present where data collection is made on different levels. In the nucleus flocks, data collection is covering the whole breeding and production, while on the multiplying farms only the data of reproduction is known, but the production yields are not logged. Only Hungarian Merino sheep are kept on these latter farms. The flock sizes on these two types of farms are rather different (Table 1). The average nucleus flocks are much smaller than the multiplying ones. In most of the farms which have Merino nucleus flocks multiplying flocks are also kept.

Table 1. The number of ewes in nucleus and multiplying flocks (01.01.1997)

No. of ewes in the flock		Nucleus flocks	Multiplying flocks
1 -	50	27	
50 -	100	21	
100 -	200	31	
200 -	300	17	
300 -	400	11	110
400 -	500	5	35
500 -	750	6	29
750 -	1000	7	8
1000 -	2000	7	12
2000 -	3000	2	12
3000 -	5000	-	4
Altogether	No. of. flocks	134	210
	No. of ewes	40,500	811,000

The levels of the automation

The first level of automation is when the necessary equipments are introduced into the performance test. These are the automatic weighers, different microcomputers, milk measuring machines and wool fibre measuring equipments.

The second level is when the animals have individual electronic identifications and the measurements are made by automatic equipments controlled by computers.

In Hungary both levels of automation could be found, but in general we are in the middle of the first one.

In wool production only the measuring of wool fibre diameter has been automated, where one Peyer FDA-200 laser machine is used. Data are collected on paper using different forms from where the instructors fill up their notebooks. Our future plans, include obtaining an OFDA type machine occurs which will give us the possibility to have direct communication between the notebooks of instructors and this central machine.

In meat production very limited number of automatic weighters are used, but the ear-tag numbers have to be printed into their own computers. These equipments are still too expensive for general utilization. So, the data are mainly collected on different forms from where the computers are filled in.

In milk production there are two places of data collection. In the laboratory, where the milk components are determined automatic equipments are used. During the test the milk quantity has to be read from the scales of the measuring equipments. Data are still collected on forms. In the near future small computers will replace the paper forms at the milking parlours.

Different equipments are used to measure the milk quantity: ALFA-LAVAL type, True-Test (from New-Zealand), Sheeptest'84 (licensed by Kukovics *et. al.* in 1984). The first one is fixed, the other two are portable ones. These are functioning well, but do not give to possibility of proper automation.

Automation in performance recording

The basic condition of automation in performance recording is the presence of electronic individual identification.

In meat performance recording no microchip could be found in the animals on test units or nucleus farms. The reason for this is simple. The prices of the necessary equipments (microchips, readers,

automatic feeders, automatic weighers) are still too high to introduce them. There were some trials during the last couple of years to test the transponders implanted in the body but the results of these experiments were not favourable. Probably the other system where the transponders are built into the ear-tags will be the solution because this kind of equipment can be used many times. Unfortunately we could not test this kind of transponders in Hungary, yet.

In milk performance recording there is an experimental farm where the automatic data collection is functioning. The milking ewes are carrying transponders hanging down from their neck, which are read at the milking stalls and at the automatic feeders. The system was built up six years ago by ALFA-LAVAL and the equipments were adapted from those developed for dairy cattle. The summary of this system can be seen in Fig. 2.

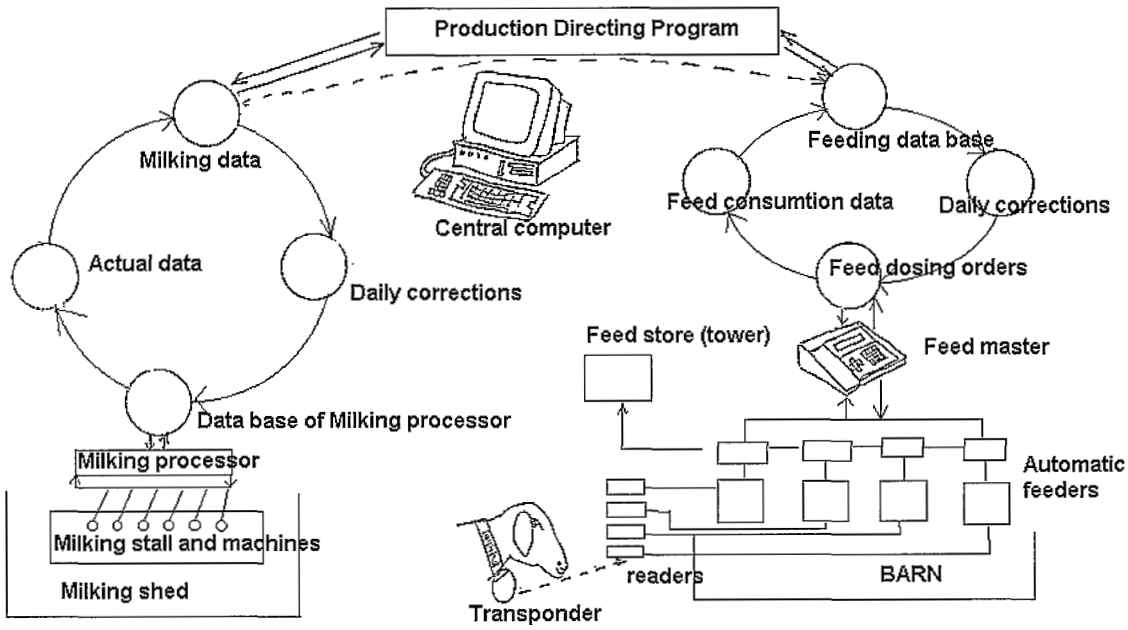

Fig. 2. Automated data collection in milk recordin g.

However, these equipments could be used for dairy cattle without any serious problems; we had several ones to solve. First of all we had to change the reading system at the stall because the original antennas were disturbing each other. So, a curtain reader is used nowadays. The measuring accuracy (100 ml) still does not fit exactly to sheep milk production. Unfortunately, we quite often had communication problems between the milking processor and the central computer. There are two things we would like to change in the system. To improve the measuring accuracy we are planning to introduce NEAR INFRA RED system developed in Israel but ALFA-LAVAL in Hungary is not ready yet to fit these equipments to our present machines. The negotiations have not been finished yet. The transponders used do not fit exactly to the sheep so we would like to replace them by the other type which are built into the ear-tag. We are on the way to getting this kind of transponders.

Conclusions

Data collection in sheep performance recording is mainly based on manual work, however, some parts of it are already automated. Based on the present situation the following conclusion can be drawn:

(i) The first step of automation could be reached when the forms in data collection can be replaced by small computers at the milking stall and at shearing.

(ii) In meat production the first step cannot be done without introducing automatic weighters.

(iii) The automation of the whole performance recording has a strong demand for introducing transponders built into the ear-tags. The other type of transponders (hanging down from the neck or wearing under the skin on different parts of the body) are not the best solution for electronical identification of sheep.

(iv) The automation of data collection in sheep industry will not be generally used provided that the prices of the necessary equipments will not be decreased to around one half of the present level.

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